Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Medicines

Ivermectin buyers clubs

People in the UK are trying to source a parasite drug to use as an unproven treatment for covid-19, reveals **Chris Stokel-Walker**

MULTIPLE "buyers clubs" are trying to import the drug ivermectin to the UK to prevent and treat covid-19, even though there is no evidence supporting use of the drug in this way, and it could even be dangerous.

The UK Medicines and Health products Regulatory Authority (MHRA) has cautioned people not to try to buy ivermectin through third parties to treat covid-19. The drug is used to treat parasite infections in humans and some other animals, but has gained a lot of attention as an unproven drug for preventing or treating covid-19.

"Ivermectin is not a licensed medicine for covid-19. It can only be taken by those participating in closely supervised and highly regulated clinical trials," an MHRA spokesperson told *New Scientist*. "Never self-prescribe or try to obtain medicines from an unregulated source – only take medicines prescribed by your doctor and obtained via a registered pharmacy or reputable outlet."

DIMAS ARDIAN/BLOOMBERG VIA GETTY IMAGES

Self-medicating with ivermectin for covid-19 could be dangerous

Highly concentrated

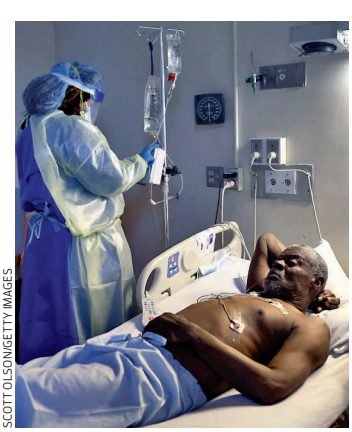
In the US, supplies of the human and livestock forms of ivermectin have run short after some people opposed to covid-19 vaccines sought to use it to treat or prevent infection. But according to the US Food and Drug Administration (FDA), current evidence doesn't show that ivermectin is effective against covid-19 – although clinical trials are ongoing.

"Taking large doses of ivermectin is dangerous," the FDA says on its website. The FDA also warns that formulations of ivermectin for animals are often highly concentrated and may contain inactive ingredients that haven't been evaluated for use in people. Poison control centres in the US are struggling with a surge of ivermectin-related cases, and health officials in New Mexico recently reported that two people died from ivermectin toxicity after taking the drug.

Throughout the pandemic, a number of drugs have attracted attention as possible preventatives of or treatments for covid-19. Like the anti-malarial drug hydroxychloroquine before it, ivermectin is being used by some people with covid-19 to try to halt the onset of symptoms, and by some people who are against vaccines as a preventative measure. Trials of hydroxychloroquine haven't found evidence of any benefits of using it for covid-19.

The desire of some to source ivermectin for covid-19 isn't limited to the US. A crowd-funded campaign in the UK called the Ivermectin Approval Club has raised more than £40,000 in a bid to gain MHRA approval for the use of ivermectin to treat covid-19.

A man with covid-19 receives remdesivir in Chicago, Illinois



SCOTT OLSON/GETTY IMAGES

If approved, the group says it would then plan to source ivermectin formulated for human use from a Bulgarian company and distribute it among members.

"We've hired regulatory consultants to submit the application for us," says Tess Lawrie of the Ivermectin Approval Club, run by UK non-profit organisation EbMCsquared. "It's a very slow process."

Lawrie believes ivermectin is a safe and effective treatment for covid-19 that can reduce the risk of people dying from the disease, and wants people to have the chance to use it – perhaps as a prophylactic for those at high risk.

But others are trying to source ivermectin without seeking regulatory approval. *New Scientist* has seen messages shared in a group on the encrypted chat app Telegram that calls itself the Ivermectin Buyers Club. The chat group isn't connected to the group seeking MHRA approval. It has around 1300 members, and the group's administrator has offered to supply ivermectin to buyers around the world for £3 a tablet.

"Ivermectin is not a licensed medicine for covid-19. It can only be taken by those in closely supervised trials"

The seller, who goes by the pseudonym Ron Woodroof – a reference to the creator of the Dallas Buyers Club, which purchased AIDS treatments in the 1980s – offered to send the tablets to me when I posed as someone interested in purchasing ivermectin.

In both a private chat and in the public group, Woodroof claimed to source the drug from a pharmacist in India and import it to the UK. Prospective clients seeking a supply of ivermectin in

the Telegram group purport to come from all over the world. Woodroof has shared evidence in the group of multiple deliveries to customers.

Woodroof told me he was selling "high grade human ivermectin" that is shipped from the UK. The seller reassured me that "more [ivermectin is] coming at all times so I wouldn't stress".

Payments in bitcoin

An MHRA spokesperson told *New Scientist* that importing ivermectin into the UK for anything other than personal use is illegal and would constitute a criminal offence. "Anyone in the UK who imports a medicine for personal use, must not sell on, or supply imported medicines to others," said the spokesperson.

In recent weeks, Woodroof has moved to accepting payment for the pills only through the encrypted and difficult-to-track cryptocurrency bitcoin. However, all transactions associated with a given bitcoin wallet are stored permanently on the blockchain, an unalterable ledger. The wallet that Woodroof asked me to send money to has received US$3863 (or 0.09 bitcoin) since the start of September. In all, 42 transactions have been associated with the wallet.

Woodroof stopped responding to me when I identified myself as a reporter. Before that, he deleted the messages we exchanged.

While unproven drugs aren't a credible alternative to vaccines, there have been some legitimate successes in repurposing existing drugs for treating covid-19. The antiviral drug remdesivir has been approved for this purpose by the FDA, as has baricitinib, a rheumatoid arthritis drug, for people on ventilators. ▮

Computing

Quantum computers can now fix their own mistakes

Matthew Sparkes

QUANTUM computers aren't yet reliable enough for mainstream use, in part because the error rates of their calculations are too high. That could soon change, because for the first time, a quantum computer has demonstrated an error-correction strategy that fixes more errors than it creates. This may provide a practical way to scale up to a machine capable of carrying out genuinely useful computations.

Ordinary computers store data as either a 0 or 1, but errors can cause the bit to "flip" to the wrong value, which is why error-correction is a standard feature of modern processors. In quantum computing, the problem is more complex because each quantum bit, or qubit, exists in a mixed state of 0 and 1, and any attempt to measure them directly destroys the data.

Several research teams are working on the problem of quantum error correction but there is a long way still to go. Google announced in July that its Sycamore processor was able to detect and fix computational errors, but the additional hardware needed to do that introduced more errors than it was able to fix.

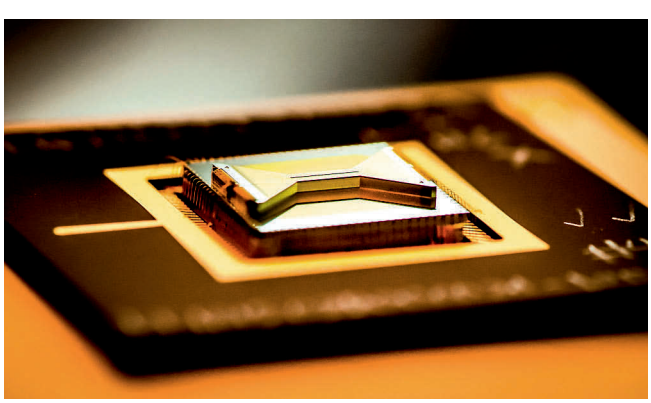
Christopher Monroe at the Joint Quantum Institute (JQI) in Maryland and his colleagues have now passed this crucial threshold. The team was able to set the state of a logical qubit – a group of 13 qubits clustered together to more reliably hold a single piece of data – and then measure it again 99.4 per cent of the time, despite relying on six individual operations that have only 98.9 per cent reliability.

Without error correction, the reliability would be expected to slip down to 93.6 per cent after all six operations (*Nature*, doi.org/gzcn).

Unlike the groups at Google and the University of Science and Technology of China (USTC), which have made big strides in recent months with superconducting qubits, the JQI group uses trapped-ion qubits. The machine uses up to 32 individual charged atoms that are manipulated with lasers.

The inherently higher stability of trapped ions allowed the team to use an error-correction strategy called a Bacon-Shor code, which superconducting qubits aren't currently high enough quality to use.

The ion-trap quantum processor used in the experiment



HUDEK/JQI

Monroe, who is also founder of quantum computing firm IonQ, which floated on the New York Stock Exchange last week, says that error correction is the key to creating practical computers, not simply making more and more qubits. Anyone creating dozens of qubits while having a high error rate is "spinning their wheels", he says, claiming that trapped-ion technology is on a steep upwards slope with only engineering hurdles ahead of it, while superconducting qubits are on a flat trajectory with large scientific breakthroughs needed to progress.

99.4%
The reliability of an error-corrected logical qubit

Despite this, the only claims of quantum supremacy so far have both included superconducting qubits, and the number of qubits used in them has been rising steadily over the past year.

Monroe concedes, however, that his team was only able to demonstrate error-correction on a single logical qubit, and that the next challenge is to scale up to two or more. "We need to think higher now," he says.

Peter Knight at Imperial College London agrees that the trapped-ion approach does have some advantages over the superconducting plan being followed by Google and USTC. Ions in a trapped-ion computer are physically identical, whereas superconducting qubits can vary, he says. "With superconducting qubits there's a lot of surface noise. With each qubit you have to do a lot of tuning to make it as identical as you can to another, whereas nature gives you identical trapped ions." ▮